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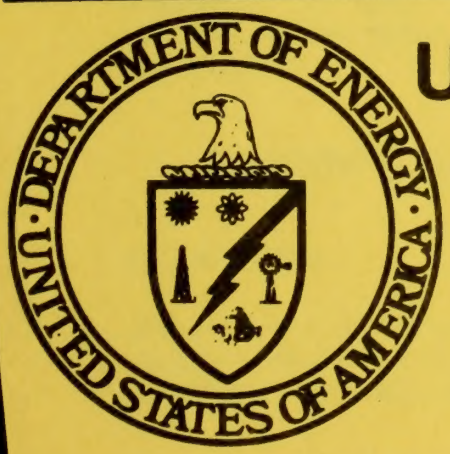
Monthly Performance Report

MONTECITO PINES

FEBRUARY 1979



U.S. Department of Energy

National Solar Heating and Cooling Demonstration Program

National Solar Data Program

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MONTHLY PERFORMANCE REPORT

MONTECITO PINES

FEBRUARY 1979

I. SYSTEM DESCRIPTION

The Montecito Pines site is an apartment complex in Santa Rosa, California. It consists of one instrumented unit containing eight apartments. Each apartment has approximately 864 square feet of conditioned space. Solar energy is used for space heating and preheating domestic hot water (DHW). The solar energy system which serves the 8-apartment unit has an array of flat-plate collectors with a gross area of 950 square feet. The array faces 22 degrees west of south at an angle of 45 degrees to the horizontal. Water is the transfer medium that delivers solar energy from the collector array to storage and to the space heating and hot water loads. Freeze protection is provided by drain down. Solar energy is stored underground in a 2000-gallon insulated tank. City water is circulated through a heat exchanger in the storage tank for preheating before entering a gas-fired boiler which supplies DHW on demand. When solar energy is insufficient to satisfy the space heating load, the gas-fired boiler provides auxiliary energy for space heating. The system, shown schematically in Figure 1, has four modes of solar operation.

Mode 1 - Collector-to-Storage: This mode activates when the collector plate temperature exceeds the storage temperature by 17°F and terminates when a temperature difference of 3°F is reached. Collector loop pump P1 is operating.

Mode 2 - Storage-to-Space Heating: This mode activates when there is a space heating demand and the temperature at the top of the storage tank is 105°F or higher. Space heating pump P2 is operating and mode diversion valves V1 and V2 divert the flow to the heat exchanger in the storage tank and bypass the gas-fired boiler.

Mode 3 - Auxiliary Space Heating, DHW Preheating: This mode activates when there is a space heating demand and the temperature at the top of the storage tank is less than 105°F. Space heating pump P2 is operating and mode diversion valves V1 and V2 direct the flow through the gas-fired boiler and bypass the heat exchanger in the storage tank.

Mode 4 - DHW Preheating: This mode activates when there is a demand for DHW. Incoming city water passes through the heat exchanger in the storage tank on the way to the gas-fired boiler which supplies hot water, on demand, to the apartments.

II. PERFORMANCE EVALUATION

INTRODUCTION

The site was occupied during the month of February, and the solar energy system operated continuously during the month. Solar energy satisfied 55 percent of the DHW requirements and 9 percent of the space heating requirements.

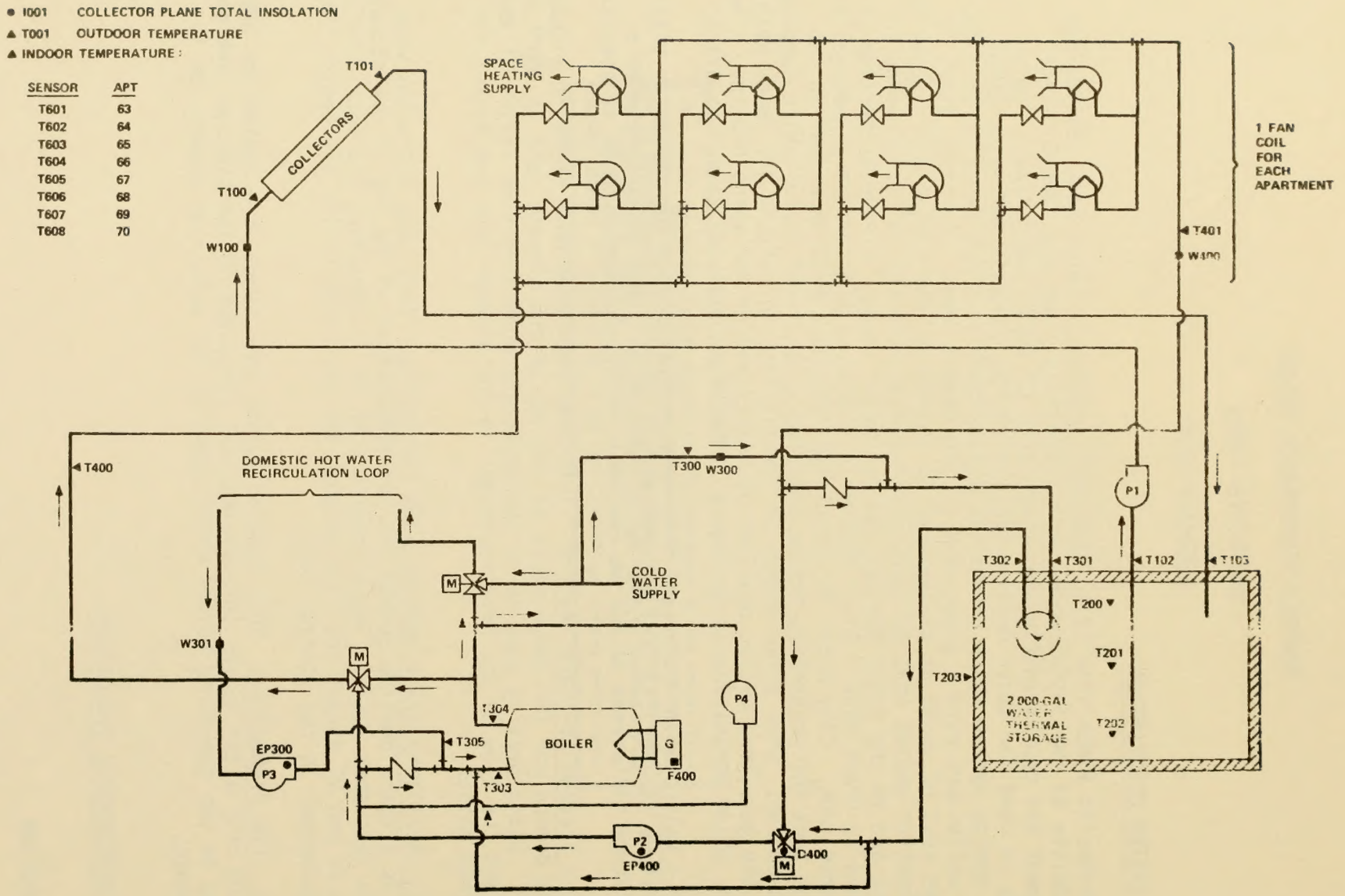

Figure 1. MONTECITO PINES APARTMENTS SOLAR ENERGY SYSTEM SCHEMATIC

The solar energy system provided fossil fuel energy savings of 10.8 million Btu at an expense of 0.44 million Btu of electricity.

WEATHER CONDITIONS

During the month, total incident solar energy on the collector array was 28.5 million Btu for a daily average of 1072 Btu per square foot. This was below the estimated average daily solar radiation for this geographical area during February of 1404 Btu per square foot for a plane facing 22 degrees west of south with a tilt of 45 degrees to the horizontal. The average ambient temperature during February was 46°F as compared with the long-term average for February of 51°F. The number of heating degree-days for the month (based on a 65°F reference) was 521, as compared with the long-term average of 402.

THERMAL PERFORMANCE

System - During February the solar energy system performed approximately the same as expected. The expected performance resulted from a modified f-chart analysis using measured weather and subsystem loads as inputs. The amount of solar energy collected was 8.6 million Btu versus an estimated 8.4 million Btu. The amount of solar energy used by the system was estimated by assuming that all energy collected would be applied to the load. The actual amount of solar energy used was 6.4 million Btu. System total solar fraction was 20 percent versus an estimated 20 percent.

Collector - The total incident solar radiation on the collector array for the month of February was 28.5 million Btu. During the period the collector loop was operating, the total insolation amounted to 24.8 million Btu. The total collected solar energy for the month of February was 8.6 million Btu, resulting in a collector array efficiency of 30 percent, based on total incident insolation. Solar energy delivered from the collector array to storage was 8.0 million Btu. Energy loss during transfer from the collector array to storage was 0.68 million Btu. This loss represented 8 percent of the energy collected. Operational energy required by the collector loop was 0.44 million Btu.

Storage - Solar energy delivered to storage was 8.0 million Btu and there was no auxiliary energy contribution to storage. There were 7.1 million Btu delivered from storage to the DHW and space heating subsystems. Energy loss from storage was 0.94 million Btu. This loss represented 12 percent of the energy delivered to storage. The storage efficiency was 88 percent: This is calculated as the ratio of the sum of the energy removed from storage and the change in stored energy, to the energy delivered to storage. The average storage temperature for the month was 100°F.

DHW Load - The DHW subsystem consumed 4.0 million Btu of solar energy and 4.6 million Btu of auxiliary thermal energy (equivalent to 5.8 million Btu of auxiliary fossil fuel energy) to satisfy a hot water load of 7.3 million Btu. The solar fraction of this load was 55 percent. Losses from the DHW subsystem were 1.4 million Btu. The DHW subsystem consumed a total of 0.63 million Btu of operating energy. A daily average of 430 gallons of DHW was consumed at an average temperature of 133°F delivered from the tank.

Space Heating Load - The space heating subsystem consumed 2.4 million Btu of solar energy and 31.8 million Btu of auxiliary thermal energy (equivalent to 39.7 million Btu of auxiliary fossil fuel energy) to satisfy a space heating load of 25.8 million Btu. The solar fraction of this load was 9 percent. Losses from the space heating subsystem were 8.3 million Btu. The space heating subsystem consumed a total of 2.0 million Btu of operating energy.

OBSERVATIONS

Sensor anomalies in the space heating subsystem existed in February and required extensive software filtering of the data. The gas totalizer sensor continued to provide anomalous data.

ENERGY SAVINGS

The solar energy system provided a total fossil fuel energy savings of 10.8 million Btu at an expense of 0.44 million Btu of electrical energy. The DHW subsystem provided a fossil fuel energy savings of 6.7 million Btu, while the space heating subsystem contributed a fossil fuel energy savings of 3.9 million Btu.

III. ACTION STATUS

No action has been scheduled to correct the identified anomalies at this site.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
SITE SUMMARY

SITE: MONTECITO PINES SANTA ROSA, CA SOLAR/1045-79/02
REPORT PERIOD: FEBRUARY,1979

SITE/SYSTEM DESCRIPTION:
MONTECITO PINES IS AN APARTMENT COMPLEX WITH EIGHT INSTRUMENTED UNITS. THE SOLAR ENERGY SYSTEM PROVIDES SPACE HEATING AND DOMESTIC HOT WATER. THE COLLECTION STORAGE LOOP USES WATER FOR THE ENERGY TRANSFER AND STORAGE MEDIUM. WATER FOR DOMESTIC HOT WATER USE PASSES THROUGH A HX IN THE STORAGE TANK AND THEN THROUGH A GAS FIRED BOILER IN THE DHW RECIRC. LOOP. WATER FOR SPACE HEATING CIRCULATES THROUGH THE STORAGE TANK HX OR THROUGH THE GAS FIRED BOILER AND IS AVAILABLE TO INDIVIDUAL APARTMENTS ON DEMAND.

GENERAL SITE DATA:

INCIDENT SOLAR ENERGY	28.515	MILLION BTU
	30016	BTU/SQ.FT.
COLLECTED SOLAR ENERGY	8.640	MILLION BTU
	9095	BTU/SQ.FT.
AVERAGE AMBIENT TEMPERATURE	46	DEGREES F
AVERAGE BUILDING TEMPERATURE	68	DEGREES F
SOLAR CONVERSION EFFICIENCY	C.23	
SOLAR OPERATING ENERGY	0.440	MILLION BTU
TOTAL SYSTEM OPERATING ENERGY	3.029	MILLION BTU
TOTAL ENERGY CONSUMED	57.221	MILLION BTU

SUBSYSTEM SUMMARY:

	HOT WATER	HEATING	COOLING	SYSTEM TOTAL	
LOAD	7.252	25.824	N.A.	32.887	MILLION BTU
SOLAR FRACTION	55	9	N.A.	20	PERCENT
SOLAR ENERGY USED	4.010	2.367	N.A.	6.453	MILLION BTU
OPERATING ENERGY	0.627	1.961	N.A.	3.029	MILLION BTU
AUX. THERMAL ENERGY	4.638	31.750	N.A.	36.430	MILLION BTU
AUX. ELECTRIC FUEL	N.A.	N.A.	N.A.	N.A.	MILLION BTU
AUX. FOSSIL FUEL	5.798	39.688	N.A.	45.538	MILLION BTU
ELECTRICAL SAVINGS	0.000	0.000	N.A.	-0.440	MILLION BTU
FOSSIL SAVINGS	6.684	3.945	N.A.	10.754	MILLION BTU

SYSTEM PERFORMANCE FACTOR: 0.591

* DENOTES UNAVAILABLE DATA
@ DENOTES NULL DATA
N.A. DENOTES NOT APPLICABLE DATA

REFERENCE: USER'S GUIDE TO THE MONTHLY PERFORMANCE REPORT OF THE NATIONAL SOLAR DATA PROGRAM,FEBRUARY 28,1978, SOLAR/0004-78/18

SOLAR HEATING AND COOLING DEMONSTRATION PROGRA'

MONTHLY REPORT
SITE SUMMARY

SITE: MONTECITO PINES SANTA ROSA, CA SOLAR/1045-79/02
REPORT PERIOD: FEBRUARY,1979

SITE/SYSTEM DESCRIPTION:
MONTECITO PINES IS AN APARTMENT COMPLEX WITH EIGHT INSTRUMENTED UNITS. THE SOLAR ENERGY SYSTEM PROVIDES SPACE HEATING AND DOMESTIC HOT WATER. THE COLLECTION STORAGE LOOP USES WATER FOR THE ENERGY TRANSFER AND STORAGE MEDIUM. WATER FOR DOMESTIC HOT WATER USE PASSES THROUGH A HX IN THE STORAGE TANK AND THEN THROUGH A GAS FIRED BOILER IN THE DHW RECIRC. LOOP. WATER FOR SPACE HEATING CIRCULATES THROUGH THE STORAGE TANK HX OR THROUGH THE GAS FIRED BOILER AND IS AVAILABLE TO INDIVIDUAL APARTMENTS ON DEMAND.

GENERAL SITE DATA:

INCIDENT SOLAR ENERGY	30.083 GIGA JOULES
	340858 KJ/SQ.M.
COLLECTED SOLAR ENERGY	9.116 GIGA JOULES
	103284 KJ/SQ.M.
AVERAGE AMBIENT TEMPERATURE	8 DEGREES C
AVERAGE BUILDING TEMPERATURE	20 DEGREES C
ECSS SOLAR CONVERSION EFFICIENCY	0.23
ECSS OPERATING ENERGY	0.465 GIGA JOULES
TOTAL SYSTEM OPERATING ENERGY	3.196 GIGA JOULES
TOTAL ENERGY CONSUMED	60.368 GIGA JOULES

SUBSYSTEM SUMMARY:

	HOT WATER	HEATING	COOLING	SYSTEM TOTAL
LOAD	7.651	27.244	N.A.	34.696 GIGA JOULES
SOLAR FRACTION	55	9	N.A.	20 PERCENT
SOLAR ENERGY USED	4.231	2.497	N.A.	6.808 GIGA JOULES
OPERATING ENERGY	0.662	2.069	N.A.	3.196 GIGA JOULES
AUX. THERMAL ENG	4.893	33.496	N.A.	38.434 GIGA JOULES
AUX. ELECTRIC FUEL	N.A.	N.A.	N.A.	N.A. GIGA JOULES
AUX. FOSSIL FUEL	6.116	41.871	N.A.	48.042 GIGA JOULES
ELECTRICAL SAVINGS	0.000	0.000	N.A.	-0.465 GIGA JOULES
FOSSIL SAVINGS	7.052	4.162	N.A.	11.346 GIGA JOULES

SYSTEM PERFORMANCE FACTOR: 0.591

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SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
ENERGY COLLECTION AND STORAGE SUBSYSTEM (ECSS)

SITE: MONTECITO PINES SANTA ROSA, CA SOLAR/1045-79/02
REPORT PERIOD: FEBRUARY,1979

DAY OF MONTH	INCIDENT SOLAR ENERGY MILLION BTU	AMBIENT TEMP DEG-F	ENERGY TO LOADS MILLION BTU	AUX THERMAL TO ECSS MILLION BTU	ECSS OPERATING ENERGY MILLION BTU	ECSS ENERGY REJECTED MILLION BTU	ECSS SOLAR CONVERSION EFFICIENCY
1	1.319	37	0.235	N	0.018	N	0.157
2	0.921	38	0.384	O	0.012	O	0.401
3	1.616	41	0.500	T	0.022	T	0.270
4	1.729	48	0.532		0.026		0.263
5	1.513	50	0.377	A	0.025	A	0.186
6	1.548	50	0.439	P	0.024	P	0.229
7	1.398	46	0.407	P	0.023	P	0.249
8	1.178	45	0.356	L	0.015	L	0.271
9	1.019	50	0.246	I	0.021	I	0.212
10	0.418	50	0.147	C	0.011	C	0.351
11	0.527	51	0.109	A	0.012	A	0.208
12	0.094	50	0.117	B	0.000	B	1.236
13	0.032	50	0.113	L	0.000	L	3.474
14	1.200	45	0.093	E	0.027	E	0.078
15	0.306	45	0.097		0.004		0.317
16	1.277	47	0.133		0.023		0.104
17	1.220	45	0.205		0.020		0.157
18	0.377	48	0.140		0.005		0.372
19	1.832	48	0.348		0.025		0.163
20	0.061	45	0.124		0.000		2.034
21	1.207	46	0.144		0.022		0.119
22	0.824	46	0.133		0.009		0.161
23	1.487	46	0.386		0.020		0.241
24	1.342	47	0.231		0.022		0.172
25	0.680	50	0.148		0.009		0.217
26	1.769	48	0.379		0.022		0.186
27	1.531	45	0.399		0.022		0.231
28	0.090	44	0.208		0.000		2.302
SUM	28.515	-	7.131	N.A.	0.440	N.A.	-
AVG	1.018	46	0.255	N.A.	0.016	N.A.	0.226
NBS ID	Q001	N113			Q102		N111

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
COLLECTOR ARRAY PERFORMANCE

SITE: MONTECITO PINES SANTA ROSA, CA SOLAR/1045-79/02
REPORT PERIOD: FEBRUARY,1979

DAY OF MONTH	INCIDENT SOLAR ENERGY MILLION BTU	OPERATIONAL INCIDENT ENERGY MILLION BTU	COLLECTED SOLAR ENERGY MILLION BTU	DAYTIME AMBIENT TEMP DEG F	COLLECTOR ARRAY EFFICIENCY
1	1.319	1.202	0.393	48	0.298
2	0.921	0.799	0.257	*	0.279
3	1.616	1.482	0.498	56	0.308
4	1.729	1.660	0.571	63	0.330
5	1.513	1.435	0.517	61	0.342
6	1.548	1.459	0.522	63	0.337
7	1.398	1.294	0.431	59	0.308
8	1.178	1.016	0.365	56	0.310
9	1.019	0.939	0.343	60	0.337
10	0.418	0.289	0.096	56	0.230
11	0.527	0.303	0.110	58	0.210
12	0.094	0.000	0.000	52	0.000
13	0.032	0.000	0.000	51	0.000
14	1.200	1.154	0.449	52	0.374
15	0.306	0.114	0.027	49	0.089
16	1.277	1.192	0.453	54	0.354
17	1.220	1.077	0.387	54	0.317
18	0.377	0.105	0.029	52	0.077
19	1.832	1.724	0.627	57	0.342
20	0.061	0.000	0.000	45	0.000
21	1.207	1.107	0.392	52	0.325
22	0.824	0.503	0.150	*	0.182
23	1.487	1.305	0.463	53	0.312
24	1.342	1.213	0.389	56	0.290
25	0.680	0.429	0.157	57	0.231
26	1.769	1.632	0.554	54	0.313
27	1.531	1.411	0.460	56	0.300
28	0.090	0.000	0.000	49	0.000
SUM	28.515	24.844	8.640	-	-
AVG	1.018	0.887	0.309	55	0.303
NBSID	Q001		Q100		N1C0

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
STORAGE PERFORMANCE

SITE: MONTECITO PINES SANTA ROSA, CA SOLAR/1045-79/02
REPORT PERIOD: FEBRUARY, 1979

DAY OF MONTH	ENERGY TO STORAGE MILLION BTU	ENERGY FROM STORAGE MILLION BTU	CHANGE IN STORED ENERGY MILLION BTU	STORAGE AVERAGE TEMP DEG F	STORAGE EFFICIENCY
1	0.405	0.235	0.041	103	0.682
2	0.245	0.384	0.006	104	1.592
3	0.507	0.500	0.004	107	0.993
4	0.558	0.532	0.004	108	0.961
5	0.482	0.377	0.054	109	0.895
6	0.479	0.439	-0.024	108	0.865
7	0.398	0.407	-0.045	107	0.910
8	0.325	0.356	-0.019	104	1.038
9	0.301	0.246	0.004	103	0.833
10	0.069	0.147	-0.087	99	0.869
11	0.078	0.109	-0.058	95	0.659
12	0.000	0.117	-0.119	89	1.000
13	0.000	0.113	-0.103	82	1.000
14	0.379	0.093	0.220	87	0.828
15	0.023	0.097	-0.093	90	0.188
16	0.415	0.133	0.173	93	0.736
17	0.379	0.205	0.066	101	0.717
18	0.021	0.140	-0.125	99	0.742
19	0.578	0.348	0.151	101	0.865
20	0.000	0.124	-0.128	99	1.000
21	0.335	0.144	0.126	99	0.805
22	0.129	0.133	-0.022	102	0.863
23	0.438	0.386	-0.012	103	0.854
24	0.336	0.231	0.049	103	0.834
25	0.138	0.148	-0.056	103	0.669
26	0.517	0.379	0.044	106	0.818
27	0.422	0.399	-0.005	106	0.933
28	0.000	0.208	-0.158	99	1.000
SUM	7.956	7.131	-0.111	-	-
AVG	0.284	0.255	-0.004	100	0.882
NBS ID	Q200	Q201	Q202		N108

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
HOT WATER SUBSYSTEM

SITE: MONTECITO PINES SANTA ROSA, CA SOLAR/1045-79/02
REPORT PERIOD: FEBRUARY, 1979

DAY OF MON.	HOT WATER LOAD MILLION BTU	SOLAR FR.OF LOAD PER CENT	SOLAR ENERGY USED MILLION BTU	OPER ENERGY MILLION BTU	AUX THERMAL USED MILLION BTU	AUX ELECT FUEL MILLION BTU	AUX FOSSIL FUEL MILLION BTU	ELECT ENERGY SAVINGS MILLION BTU	FOSSIL ENERGY SAVINGS MILLION BTU	SUP. WAT. TEMP DEG F	HOT WAT. TEMP DEG F	HOT WATER USED GAL
1	0.168	58	0.098	0.023	0.109	N	0.136	0.000	0.163	57	135	268
2	0.310	60	0.187	0.022	0.164	O	0.205	0.000	0.312	56	133	506
3	0.156	52	0.096	0.023	0.166	T	0.207	0.000	0.161	58	136	242
4	0.275	66	0.180	0.023	0.110		0.137	0.000	0.300	56	133	431
5	0.234	63	0.148	0.024	0.399	A	0.499	0.000	0.246	59	136	386
6	0.242	60	0.145	0.024	0.153	P	0.191	0.000	0.242	62	136	411
7	0.228	60	0.136	0.023	0.148	P	0.185	0.000	0.227	57	139	357
8	0.271	61	0.165	0.023	0.174	L	0.218	0.000	0.274	58	134	463
9	0.252	59	0.147	0.022	0.173	I	0.216	0.000	0.246	58	134	413
10	0.256	58	0.147	0.022	0.096	C	0.120	0.000	0.245	59	132	422
11	0.218	50	0.109	0.022	0.140	A	0.175	0.000	0.182	61	133	358
12	0.271	43	0.117	0.022	0.192	B	0.240	0.000	0.194	59	132	455
13	0.321	35	0.113	0.022	0.291	L	0.364	0.000	0.188	57	129	567
14	0.245	38	0.093	0.022	0.177	E	0.221	0.000	0.155	60	130	423
15	0.220	44	0.097	0.022	0.139		0.174	0.000	0.162	58	129	380
16	0.274	48	0.133	0.022	0.163		0.204	0.000	0.222	58	131	461
17	0.234	57	0.133	0.022	0.096		0.120	0.000	0.221	59	134	394
18	0.251	56	0.140	0.022	0.137		0.172	0.000	0.234	60	132	422
19	0.276	56	0.156	0.023	0.200		0.250	0.000	0.259	58	135	447
20	0.220	56	0.124	0.022	0.123		0.153	0.000	0.207	59	132	374
21	0.256	56	0.144	0.022	0.133		0.166	0.000	0.240	59	130	437
22	0.233	57	0.133	0.022	0.127		0.159	0.000	0.222	58	131	399
23	0.338	59	0.200	0.022	0.192		0.240	0.000	0.333	57	134	540
24	0.378	61	0.231	0.022	0.170		0.212	0.000	0.385	58	132	628
25	0.240	62	0.148	0.022	0.131		0.164	0.000	0.246	58	134	391
26	0.233	54	0.125	0.023	0.156		0.195	0.000	0.209	61	137	385
27	0.266	59	0.156	0.023	0.209		0.262	0.000	0.260	59	134	443
28	0.386	54	0.208	0.022	0.170		0.213	0.000	0.347	59	131	634
SUM	7.252	-	4.010	0.627	4.638	N.A.	5.798	0.000	6.684	-	-	12034
AVG	0.259	55	0.143	0.022	0.166	N.A.	0.207	0.000	0.239	58	133	430
NBS	Q302	N300	Q300	Q303	Q301	Q305	Q306	Q311	Q313	N305	N307	N308

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COCLING DEMONSTRATION PROGRAM

MONTHLY REPORT
SPACE HEATING SUBSYSTEM

SITE: MONTECITO PINES SANTA ROSA, CA SCLAR/1045-79/02
REPORT PERIOD: FEBRUARY,1979

DAY OF MON.	SPACE HEATING LOAD MILLION BTU	SOLAR FR.OF LOAD PCT	SOLAR ENERGY USED MILLION BTU	OPER ENERGY MILLION BTU	AUX THERMAL USED MILLION BTU	AUX ELECT FUEL MILLION BTU	AUX FOSSIL FUEL MILLION BTU	ELECT ENERGY SAVINGS MILLION BTU	FOSSIL ENERGY SAVINGS MILLION BTU	BLDG TEMP DEG. F	AMB TEMP DEG. F
1	1.188	9	0.110	0.071	1.452	N	1.815	0.000	0.183	64	37
2	1.237	14	0.182	0.071	1.395	O	1.744	0.000	0.304	64	38
3	1.335	19	0.255	0.071	1.082	T	1.353	0.000	0.425	66	41
4	0.994	30	0.275	0.070	1.040		1.300	0.000	0.459	68	48
5	0.596	21	0.142	0.071	0.655	A	0.819	0.000	0.237	68	50
6	0.610	38	0.209	0.071	0.399	P	0.498	0.000	0.348	69	50
7	0.827	29	0.211	0.071	0.876	P	1.095	0.000	0.352	68	46
8	1.006	14	0.154	0.070	1.156	L	1.445	0.000	0.257	68	45
9	0.724	10	0.068	0.070	0.850	I	1.062	0.000	0.113	69	50
10	0.920	0	0.000	0.070	1.409	C	1.761	0.000	0.000	71	50
11	0.620	0	0.000	0.069	0.958	A	1.197	0.000	0.000	70	51
12	0.817	0	0.000	0.069	1.132	B	1.415	0.000	0.000	70	50
13	1.005	0	0.000	0.070	1.291	L	1.613	0.000	0.000	70	50
14	1.069	0	0.000	0.070	1.395	E	1.744	0.000	0.000	69	45
15	1.258	0	0.000	0.070	1.637		2.046	0.000	0.000	69	45
16	0.966	0	0.000	0.070	1.304		1.630	0.000	0.000	69	47
17	0.789	6	0.059	0.070	1.127		1.409	0.000	0.098	67	45
18	0.963	0	0.000	0.070	1.339		1.673	0.000	0.000	68	48
19	0.758	19	0.142	0.070	0.863		1.079	0.000	0.237	68	48
20	1.083	0	0.000	0.070	1.466		1.832	0.000	0.000	67	45
21	1.053	0	0.000	0.070	1.432		1.791	0.000	0.000	68	46
22	0.956	0	0.000	0.070	1.325		1.656	0.000	0.000	68	46
23	0.844	16	0.158	0.070	1.015		1.269	0.000	0.263	68	46
24	0.895	0	0.000	0.070	1.198		1.498	0.000	0.000	68	47
25	0.740	0	0.000	0.069	1.036		1.296	0.000	0.000	69	50
26	0.656	29	0.204	0.071	0.625		0.782	0.000	0.340	68	48
27	0.911	22	0.197	0.071	0.945		1.181	0.000	0.329	67	45
28	1.002	0	0.000	0.070	1.347		1.684	0.000	0.000	67	44
SUM	25.824	-	2.367	1.961	31.750	N.A.	39.688	0.000	3.945	-	-
AVG	0.922	9	0.085	0.070	1.134	N.A.	1.417	0.000	0.141	68	46
NBS	Q402	N400	Q400	Q403	Q401		Q410	Q415	Q417	N406	N113

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
ENVIRONMENTAL SUMMARY

SITE: MONTECITO PINES SANTA ROSA, CA SOLAR/1045-79/02
REPORT PERIOD: FEBRUARY,1979

DAY OF MONTH	TOTAL INSOLATION BTU/SQ.FT	DIFFUSE INSOLATION BTU/SQ.FT	AMBIENT TEMPERATURE DEG F	DAYTIME AMBIENT TEMP DEG F	RELATIVE HUMIDITY PERCENT	WIND DIRECTION DEGREES	WIND SPEED M.P.H.
1	1388	N	37	48	N	N	N
2	970	O	38	*	O	O	O
3	1701	T	41	56	T	T	T
4	1820		48	63			
5	1593	A	50	61	A	A	A
6	1630	P	50	63	P	P	P
7	1471	P	46	59	P	F	P
8	1240	L	45	56	L	L	L
9	1072	I	50	60	I	I	I
10	440	C	50	56	C	C	C
11	554	A	51	58	A	A	A
12	99	B	50	52	B	B	B
13	34	L	50	51	L	L	L
14	1263	E	45	52	E	E	E
15	322		45	49			
16	1345		47	54			
17	1284		45	54			
18	397		48	52			
19	1929		48	57			
20	64		45	45			
21	1271		46	52			
22	867		46	*			
23	1565		46	53			
24	1413		47	56			
25	716		50	57			
26	1862		48	54			
27	1611		45	56			
28	95		44	49			
SUM	30016	N.A.	-	-	-	-	-
AVG	1072	N.A.	46	55	N.A.	N.A.	N.A.
NBS ID	Q001		N113			N115	N114

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